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ABSTRACT

The document reports on the belief-assessment phase of a project undertaken in 1973 at the University of Utrecht, Netherlands, to study curriculum processes based on the Curvo strategy. The Curvo strategy (named for a combination of the first letters of the Dutch words for curriculum, development, and research) is based on the assumption that curriculum development is a task for teams made up of individuals with different perspectives and from different disciplines. The first step in the Curvo strategy is to bring together ideas about the content and form of the curriculum material. Successive steps include formative evaluation, testing and adjusting material in accordance with evaluative findings, developing a framework, and constructing materials to fit the framework. During all phases of the curriculum development task, team members are directed to make basic propositions and beliefs explicit. A system was also developed for evaluating implicit individual beliefs. This system centered on comparing a number of curriculum statements from each team member to ascertain underlying perspectives. Findings from numerous attempts by project staff members to assess the relative importance of explicit versus implicit beliefs indicated that implicit beliefs were much more important than had previously been realized and very difficult to deal with. The conclusion is that team members involved in developing curriculum according to the Curvo strategy will be more successful if they try to make implicit beliefs into explicit beliefs which can be used as criteria in the conduct of all phases of team deliberation, framework creation, and activity development. (DB)

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THE FUNCTION OF EXPLICIT AND IMPLICIT BELIEFS IN THE PROCESS OF DEVELOPING CURRICULUM MATERIALS

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Errata list:

p. 1	Basic Principle 1945	=	1950
p. 6	Taba 1968	=	Taba 1962
	Schwab 1979	=	Schwab 1969
p. 14	metioned	=	mentioned
p. 15	"there was enough of that in it"	=	"there was not enough of that in it"
p. 19	$r_s = 0$	=	$r_s \leq 0$
p. 21	Category M.E. etc.	=	S.A.M.E.
p. 23 (line 2)	To test hypothesis II	=	To test hypothesis I
p. 24	Table 6 shows the rating found (These were calculated etc.	=	These were calculated
p. 28	Eisner 1978	=	Eisner 1979

Preface

In 1973 the Curvo project was started in the State University of Utrecht. The object of the project was (and is) the study of systematically designed curriculum development processes proceeding from the previously developed Curvo strategy.
The initial version of the Curvo strategy was completed in 1976. During the first stage of the investigation this strategy was evaluated for formative purposes. Based on this evaluation, a second version appeared in 1979. From 1978 onwards, evaluating the Curvo strategy in its entirety was no longer the central question, while on the other hand the investigation concentrated on three separate issues:

1. The functioning of beliefs in curriculum development processes.
2. The part of the strategy concerned with formative evaluation (a subdivision of the Curvo strategy).
3. Conditions under which the Curvo strategy may or may not be used.

This paper deals with part of the first problem: the functioning of beliefs. At the heart of the discussion is the question of rationality of deliberation processes as an important variable in how beliefs function. From a research point of view, this is a thorny field, in respect of which we hope that this paper will initiate further sharpening of methods and instruments of research.

We wish to thank the Foundation for Educational Research, the Netherlands, for their financial support of this study.

Utrecht, February 1981

Henk A.M. Franssen
Arno J.C Reints

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1. Introduction

1.1. The Curvo Strategy: Structuring the Development of Curriculum Materials

Taking a publication by E. Eisner (New York, 1979, pp. 6-10) as our starting-point, the history of curriculum development in the United States may be described as follows.
At the turn of the century and for some time to follow the educational field was dominated intellectually by two men, Thorndike and Dewey. Both were convinced of the potential of scientific research "as a means of informing and guiding educational practice". They heavily influenced later theorists such as F. Bobbitt (1924) and W.W. Charters (1923). In 1928 H. Harap's The Technique of Curriculum Making was published. Fully in line with his predecessors, Harap's aim was to create a systematic technology of curriculum development.

The appearance of Tyler's book Basic Principles of Curriculum and Instruction (1945) marked a milestone. For a characterization as well as a critique of the book, Eisner's words are quoted: "Although Tyler emphatically says the monograph deals with the principles rather than with specific steps in curriculum building, the tone of the work, like the tone of the work that preceded it in the field, is a no-nonsense, straight-forward, systematic conception of what in practice is a complex, fluid, halting, adventitious task" (p. 10).

In more recent years, writers such as Bereiter, Gagné, Glaser, Popham and others have further elaborated curriculum development in a technological sense. They insist on the significance of objectives which are precisely defined, preferably at the beginning of the development process. Some investigators, Eisner's description continues, have become sceptical as to the influence scientific research may exercise on curriculum practices, whereas Walker in 1975 discusses the "myth that all curriculum development should begin with objectives and work in a formal and systematic way toward the creation and evaluation of plans and materials" (Walker, 1975, p. 133).

In the Netherlands, scientific research relating to the development of curriculum materials has a much shorter history than in the United States. Not until approximately fifteen years ago has curriculum

materials become an object of research and theory in the Netherlands. In respect of theory-making, K. Taba's Curriculum Development, Theory and Practice, published in 1962, has been highly influential. Taba may be considered a representative of technological curriculum development, although in a moderate degree.

By the end of 1973 the Curvo project was initiated in the State University of Utrecht. The name Curvo was made up by combining the first letters of the Dutch words for curriculum, development and research. Field surveys held in the United States, Germany, Belgium and the Netherlands as part of the Curvo project had shown that although theories of curriculum development such as Taba's were known in detail to groups who were involved in curriculum development, these theories had hardly any effect on practical activities. In the Curvo project then, the intention arose of making an effort to bridge the gap which apparently existed between theory and practice.
This intention has been worked out in the form of a strategy of curriculum development, on the assumption that curriculum development is a task for teams on which several disciplines are represented, among them the practical expertise of the teacher. The strategy is of a formal nature, the same as Tyler's and Taba's models. In comparison with these there are, however, a number of differences. The strategy consists of a series of practical instructions to be acted upon; not only with regard to the development activities themselves but also with regard to the organisation of development activities and the conduct of team deliberations. The development work is structuralized in a different manner from Tyler, Taba and others taking similar views of curriculum development.

With the Curvo strategy, the first step is not to determine objectives to which the other development activities in their turn will be linked. After analysing a commission which in connection with the development work has either been received or self-imposed, the first step is to bring together ideas as to the substance and the form of the curriculum material to be developed. These general, often unspecific ideas are collected both from within and from without the development group. They may bear upon aspects of the objectives, but equally on evaluation forms or pupil grouping or a combination of these or similar features of the learning situation. The collected unspecific ideas relating to the curriculum material to be developed are intended for further processing in the course of development. This means that particular ideas will be

selected as valuable and worked out, and that new ideas and proposals as to the design of the learning process, will supplement them to make up the "framework" of the curriculum to be developed. Within the framework, the ideas that were selected and roughly worked into learning situations will be set in such order that the structure of the curriculum under development emerges. The framework also takes account of the reasons why certain elements have been included and why a particular structure has been chosen. Subsequently, useful curriculum materials are made. These may also include precisely defined objectives, just as it is intended that the other elements connected with the learning situation are included with the highest degree of exactitude. To this purpose, the strategy offers help in the way of an number of categories (see also pp. 13).

When appropriate materials in the form of the whole or part of a curriculum have been developed, the strategy demands that this material should be evaluated for formative purposes. To this end, an evaluation plan is drawn up. Inquiries are held about expert appreciation of the available material and about the ability of the (partial) curriculum to excite the process intended.
After information has been obtained, the material is adjusted accordingly. This procedure of testing and adjustment may be repeated a number of times. The information obtained may also lead the development group to turn back to earlier stages of the development process. It is the group who determines when this cyclical process should stop.

Developing a framework, drawing up an evaluation plan and the construction of curriculum material require choices and decisions to be made. Such choosing and decision procedures are prepared in two different ways. Choices and decisions are made on the basis of certain views serving as criteria; if the development group is to keep to the strategy in an adequate fashion, it must make its basic propositions and beliefs explicit and incorporate them in the "record of beliefs".
Group choices and decisions are made on the basis of mutual deliberations. The strategy aims at optimizing the deliberation process, through advice as to the optimum participation of all group members, and by encouraging that decisions will be made on substantial grounds and not on grouds such as the exercise of power, one or more group member's dominant role, or the acceptance of lame compromises. This second aim may be defined as the search for the highest degree of rationality attainable in the deliberation process.

1.2. Points of Resemblance and Divergence in Comparison with Other Development Models

In comparing the curriculum development process as designed by the Curvo strategy with designs according to Tyler's and Taba's models, some similarities and differences may now be dealt with. The same as with a Taba or Tyler design, the Curvo strategy is product-oriented. The aim is to find the shortest way to the end, a curriculum as a ready-for-use product; however, the "straightforwardness" which, Eisner argues, is characteristic of the procedure specifically of the Tyler model is relieved by permitting the occurrence of cyclical working. The development group decides on this by itself, acting also on outside information. The scope of the cycle may vary from one element of the past development process to the whole of it. Both technological forms of curriculum development and the Curvo strategy tend to favour decision-making on the ground of substantial considerations. Information from the social sciences and inquiries held as a consequence of a formative evaluation play an important role. The predominance these are given in technological development forms is modified significantly in the Curvo strategy as the factual information is an input of the deliberation process. This implies that decisions will not derive more or less directly from sciences, but that scientific arguments will be interpreted by a group and will be one factor besides information from other sources, such as the experiences of the practising member of the development group and the position taken as a consequence of the basic propositions and beliefs preferred.

We already mentioned as a point of divergence that the Curvo strategy as opposed to most other models of curriculum development gives prominence to structuring the group situation. The reason why now be clarified as follows. In the Curvo strategy's way of thinking, group effectiveness with deliberation and choice-decision processes as its essentials largely determines the quality of the curriculum as an end product and of the framework and the evaluation plan as intermediate products. In the Curvo strategy, deliberation is seen as a process of collective exploration, in which the highest possible degree of rationality is sought.
Rationality should in this context be taken as the operational form of an essential aspect of the above mentioned concept of "group effectiveness".

1.3. Theoretical Model of Research

The question may now be posed in which way the rationality of deliberations and of the processes of choosing and decision-making may be approached from a research point of view within the theoretical context outlined above.
Summarizing a few crucial ideas from the foregoing, the following answer can be formulated. Processes of choosing and decision-making require deliberation on the basis of beliefs which act as criteria and have been accepted as such by the development group. It is possible to examine whether, in the development processes structured as by the Curvo strategy, explicit beliefs in fact fulfill the criterion function ascribed to them. Below follows an account of the methods and procedures used in this study.

From the experiences in other curriculum development processes it appeared likely that beliefs are held by individual members of the development group which, even if they have been expressed in the course of the process but were not recognized or discussed as such by the group, remain inexplicit, and that these beliefs may affect the process to the same or an even higher degree. In approaching this question from a research point of view the problem arises how such implicit beliefs of individual group members may be established and how their influence may be assessed. We shall go back to these questions when the design of the study is dealt with. If the influence of implicit beliefs should prove to be higher than that of the explicit beliefs accepted by the group, it may be assumed that the development process will follow a less rational course than aimed at by the Curvo strategy. For the Curvo strategy provides for beliefs to be made explicit and accepted, so that acting upon them more closely reasoned and therefore more rational decisions may be made.

On the basis of empirical studies an instrument has been developed as part of the Curvo project in order to establish the rationality of the deliberations. The nature of this instrument will be looked at later on. If deliberation should be characterized by high rationality, also a higher degree of rationality in terms of a relatively frequent use of explicit beliefs as criteria may be assumed.

Empirical determination of the rationality of the curriculum development process is made using the following theoretical conception. Rational decisions are made on the basis of criteria derived from beliefs (also, of course, on other grounds, but these will not be considered in this connection). The degree of rationality depends on the extent to which this contention is true and to which it is not overshadowed by the influence of implicit beliefs.
The rationality of the deliberations is established as well. The correlation between the degree of rationality in deliberating and the rationality in terms of decision-making on the basis of criteria derived from explicit beliefs will be high, and they will interact positively. The observation of rationality in the above sense would confirm the correctness of certain basic ideas held in the Curvo strategy about the rationality of the deliberations and choice and decision situations and as a consequence about group effectiviness as a influential factor. If the said rationality cannot be established this means revising the strategy.

When the idea arose among Curvo project members that besides explicit beliefs (to be understood as "indexical expressions") implicit beliefs as well (to be understood as underlying theory) might come into play, this was mainly prompted by ethnomethodological writings (Cicourel, 1973; Garfinkel, 1967). These refer to the contention that investigators too easily identify indexical expressions with the intentions of the person who communicates the expression. As a result, interpretation processes which go on inside individuals tend to be neglected in research studies. Wilson (1977) offers a survey of ethnographic techniques which have been used in educational investigators into, in our terms, implicit beliefs. Most often, empirical attention to implicit beliefs has remained noticeably restricted to "implicit <u>teaching</u> theories" (Clark and Yinger, 1978; Gage, 1978).
The role of beliefs in curriculum development processes is usually discussed with reference to explicit beliefs (Taba, 1968; Schwab, 1979; Walker, 1975; Eisner, 1979).
Since empirical studies have shown that implicit beliefs held by teachers affect teaching behaviour, it is possible to assume that they enter as well into the development of curricula. As regards this study, therefore, the question is how their influence may be more closely defined.
Yinger (1977) in his thesis distinguishes two functions of what he calls

- "total goal conceptions":
  - a fuel function
  - a guiding function (p. 275).

In the Curvo strategy, these functions have been dissociated. The first function is fulfilled in that unspecific ideas are brought together (see p. 2), the second is the function of the record of beliefs, provided however that "guiding" should not quite be taken as "indicating the direction", but rather along lines associated with the use of a source of criteria for the choosing and decision process (Eisner, 1979).

2. Design and Mode of Procedure of the Investigation

The next section deals with the research design and mode of procedure of the study, split up for the two hypotheses as defined below.

2.1. The Research Hypotheses

In the foregoing, two forms of rationality have been distinguished which are assumed to be related:

a) Rationality of deliberation;
b) Rationality of the development process or, more strictly, the extent to which recorded (explicit) beliefs operate as a source of criteria for the rest of the choosing and decision-making.

The interrelatedness of both forms of rationality is the central question in the present study.

At the same time it has been argued that events in other curriculum development processes have given rise to the idea that implicit beliefs held by individual development group members may have an influence on the choosing and decision process which is equal to, if not greater than the explicit beliefs.

For the purpose of this study, therefore, two hypotheses have been formulated:

Hypothesis I : *The influence of recorded explicit beliefs on the curriculum development process (the criterion function) exceeds the influence of implicit beliefs.*

Hypothesis II: *The more rationally a development group conducts its deliberations, the better the recorded explicit beliefs will operate as criteria.*

While the second hypothesis reflects the central question raised in this study, the first hypothesis considers a possible explanation of the non-occurrence of rational choosing and decision process.
Both hypotheses have been formulated in such a way that confirmation of the hypotheses is supportive evidence for the Curvo strategy and that rejection of the hypotheses must lead to critical notes to the Curvo strategy.

As was mentioned in the introduction, this study is part of a more extensive research study which is being carried out by the "Curvo project" of the State University of Utrecht. For the purpose of that study, project members participate in four development projects, all of them using the Curvo strategy. Two of the development projects will be running until May 1981. The other two development projects have been completed. The research data presented in this paper come from one of the latter two projects. The research data of the other completed project are being worked upon at present and are not yet ready for use.

For each hypothesis the research design and mode of procedure follow below. The results of the investigation will be dealt with in section three.

2.2. Hypothesis I: Explicit and Implicit Beliefs

The first hypothesis refers to the question of the relative influence of explicit and implicit beliefs respectively on the choosing and decision-making process belonging to the development of curriculum materials.

We shall examine in turn:

a. operational definitions of the three variables of explicit belief, implicit belief, and choosing and decision-making process;
b. the instrumental operationalizations of the hypothesized relationship;
c. statistical techniques and methods used to resolve the hypothesis.

2.2.1. Operational Definitions

A belief concerning education is generally understood to be the set of ideas affecting the behaviour of teachers or of which teachers are convinced that they affect their behaviour. Such behaviour includes any act which either directly or indirectly is brought to bear upon the education, development and/or teaching of pupils at school. Accordingly, not only instructional behaviour comes under the definition but also any efforts in respect of school organization.
In the record of beliefs, statements are made which relate to the task and function of the school, the role of teachers and pupils, the relative position of the specific field of training among other fields of training, etc.

In curriculum development processes such statements will tend to be bound up rather intimately with the subject of the curriculum materials under development.

One issue in particular in the investigation is the way beliefs function in a curriculum development project. A distinction will be made between explicit beliefs and implicit beliefs.
In the next two sections both concepts will be defined operationally.

2.2.1.1. Explicit Beliefs

As was indicated earlier, the Curvo strategy requires that development groups develop and formulate a record of beliefs. And this before a start is made with the actual curriculum construction. The underlying idea is that development groups may employ the recorded beliefs as a source of criteria in further deciding on the framework, the evaluation plan and ultimately the curriculum materials. It is assumed that a failure to accomplish such a record of beliefs will be sharply detrimental to the development process: the process will be conducted less rationally and efficiently and the final consensus on the completed curriculum will be lower. Through hypothesis I this "criterion function" of the recorded beliefs will be examined.

For an examination of the criterion function of explicit beliefs, a necessary preliminary was an operational definition of the concept "explicit beliefs".
As the investigation is closely related to the testing of the Curvo strategy itself, not a substantial operationalization of the concept was preferred, but a formal operational definition.
With reference to a few standards the Curvo strategy imposes on records of explicit beliefs, criteria could be developed with a view to making an inventory of belief statements.

Based on these standards, the following criteria were used in determining belief statements:

a. All statements incorporated in the record were characterized as belief statements.
b. All statements which were not incorporated in the record by the group, but which it designated as belief statements, scored as belief statements.

To this purpose the minutes of the meetings were analyzed as part of the investigation, with the help of a list of words as: fundamental, conception, philosophy, basic, essentials, principal, etc.

In the study seeking to establish the explicit beliefs, then, the following sources were used:
- the written "record of explicit beliefs"
- the minutes of meetings;
- a list of reference words (analytical list).

Based on the analysis of the minutes and the written record, a list containing n belief statements (items) emerged, which was called the Be-list in the deliberations (the list of the explicit beliefs).

2.2.1.2. Implicit Beliefs

Implicit beliefs, as opposed to explicit beliefs, are bound up with individuals and as a logical consequence of their nature, they have never been explicitly dealt with in the course of the development process. For this reason they are neither evident to the group as a whole, nor a possible subject of the discussion. Several individuals may, however, have identical implicit beliefs.

Implicit beliefs can never be directly established, but have to be derived, that is, implicit beliefs call for interpretation. The interpretation is based on curriculum statements by the members of the development process. Only if more than one curriculum statement may be interpreted as evidence of the same perspective, the existence of a particular implicit belief may be inferred. The perspectives have been laid down in a system of examples. This system of examples comprises a number of categories embodying statements in respect of instruction which (may) have been made by curriculum developers. It may be considered a device to help the investigator find implicit beliefs, functioning as an observation heuristic.

In order to permit the identification of implicit beliefs, a number of analytical steps has been determined which are followed by the investigator in his dealings with the subject-matter, such as the protocols of meetings. The procedure seeks to focus the investigator's attention increasingly on those statements and phenomena referring to the curriculum materials which might prove to be important (progressive focusing procedure).

To begin with, the whole of the subject-matter is read through to gather an impression of the development process, and then the investigator repeats his reading, but more sharply attentive to significant stages of the process. In this, the system of examples has a steering function. Through the selection and bringing into connection of suitable statements and phenomena referring to curriculum materials, the existence of particular implicit beliefs is provisionally admitted.
The findings are contrasted with those of another investigator of the same subject-matter. After a comparison, only those beliefs are maintained in the study which the two investigators have found independently. This final list is submitted for approval to the investigator who participates in the examined development process. It is this list which will further be referred to as the Bi-list.

2.2.1.3. The Development Process

In hypothesis I, the concepts of explicit beliefs and implicit beliefs may be assumed to be independent variables. In discussing the operational definitions of the concepts, we must now pay attention to the dependent variable: the development process, or, more strictly speaking; the process of choosing and decision-making.

Here then it is an important consideration that in the Curvo project's view, curriculum development is a process that in the end points to a product: the curriculum.
In saying this, it is characterized as a product-oriented process. The specific steps as well are product-oriented in the Curvo strategy. Thus the Curvo strategy recognizes many intermediate products as outputs of different steps. That the choosing and decision making process is product-oriented accounts for the possibility that in the investigation the concept of "development process" - or "choosing and decision process" - should be substituted at the empirical level by the concept of "(intermediate) products".

Since beliefs in the end (through the choosing and decision process) have a function in the making of such products, logic demands that the influence exerted on those products by the record of explicit beliefs is examined. The products are:
- the framework
- the evaluation plan
- the curriculum.

For all products, the Curvo strategy supposes a development group to have recourse to the record of explicit beliefs. The extent to which a group does this is also an indication of the degree of which the record fulfills a criterion function.

2.2.2. Instrumental Operationalization of the Hypothesis

In the foregoing, operational definitions of the dependent and independent variables in the hypothesis have been given. In the next subsections the instrumental operationalizations of the hypothesized relationship between beliefs and the choosing and decision process will be examined.

In the first place we shall consider how the influence exerted by explicity formulated beliefs on the choice and decision process has been established, subsequently how the influence of implicit beliefs in this regard has been established.

2.2.2.1. Establishing the Influence of Explicit Beliefs

In paragraph 2.2.1.3. we set on that at an empirical level the influence of explicit beliefs was investigated as far as it pertains to three products: the framework, the evaluation plan and the curriculum. Accordingly, influence was assessed at three points of the development process. The discussion below will be elaborated mainly with reference to the influence of Be on the framework. To this purpose the following research proceedings were adopted:

1. The framework consists of a number of choises decided on for each lesson in respect of components of the learning situation.
   The following components or rather categories were distinguished:
   - subject matter
   - teacher and pupil activities (A)
   - educational materials (M)
   - evaluation (E)
   - pupil grouping (G)
   - organization (O)

   All choices made were transformed into "(framework) components" embodied in a list of components. Next the components were classified according to the above categories (interobserver agreement = 82%).

2. Subsequently a Be-list was drawn up according to the criteria metioned in 2.2.1.1.

3. Thereupon, each framework component was examined to see if grounds stated for the choice of the component were attributed to one or more explicit beliefs. To this purpose an analysis was made of the minutes of the meetings. Each time the development group expressly uses a Be as criterion source for the choice made (i.e. refers to it expressly), this was scored. In scoring the rule was adopted that a reason given for any one component and attributed to a Be scored only once.

4. Thus calculations were made to determine the percentage of components drawn from the framework for which the reasons given were prompted by the explicit beliefs. In other words: the extent of the influence of Be on the choosing and decision-making was determined.

Essentially the same procedure was adopted in establishing the influence exerted by Be on the evaluation plan and the curriculum, provided that the list of Be had to be modified where in the group's opinion changes had been necessary.

2.2.2.2. Establishing the Influence of Implicit Beliefs

The influence of implicit beliefs as well has been investigated empirically for the three products: framework, evaluation plan and curriculum. Thus, their influence is once more established at three points of the development process. Here too, the description below will focus on the influence of Bi on the framework. For this purpose the investigation comprised the following steps:

1. Preparation of a list of components (see 2.2.2.1.).
2. Preparation of a Bi-list using the procedure outlined in 2.2.1.2.
3. Thereupon every framework component was examined to see if the reason given for its being chosen could be traced to an implicit belief. For this purpose, worked-out protocols of meetings were analyzed. As opposed to the procedure with Be, in this case no explicit references by the development group were available. As a consequence, a component had to be linked to a Bi by the investigator. In order to obtain the highest reliability possible, a link was only scored in the event that there was evidence from the context of a component indicating that the component in question would have been included on the ground of an implicit belief.

Example

One inventorized belief said "the cognitive development of the child should be strongly emphasized". This belief originated with the person who had constructed the framework. At various points in the course of the development process the cognitive development of children was discussed, whereupon the person concerned invariably replied "that there was enough of that in it" (in the framework and curriculum respectively). This evidence from the context permitted us to conclude that all cognitive components taken from the framework had sprung from the unrecorded, implicit belief in this person. Thus its influence scored for all cognitive components.

4. Consequently, calculations were made to determine the percentage of framework components for which the grounds stated could reasonably be traced to implicit beliefs. In other words: the extent to the influence exerted by Bi on the choosing and decision process.

The same procedure was adopted in establishing the influence of implicit beliefs on evaluation plan and curriculum. The Bi-list remained unchanged: implicit beliefs could not be established until after analysis of the whole of the material.

2.2.3. Testing the Hypothesis

For testing the hypothesis stating that the influence exerted on the development process by explicit beliefs exceeds the influence of implicit beliefs, we wish to say this:
The three measuring points- framework, evaluation plan and curriculum - resulted in a number of components. A subset of these components is accounted for by explicit beliefs, another subset by implicit beliefs. If the subset accounted for by explicit beliefs should be greater than that accounted for by implicit beliefs, we consider this evidence in support to our hypothesis. In all other cases the hypothesis will be rejected. Statistically the expected value is:

$H_0 : p_e = p_i$ (p_e : proportion of components accounted for by Be; p_i : proportion of components accounted for by Bi)

A one-tailed test was done with $\alpha = .05$.

2.3. Hypothesis II: Rationality of Deliberation

Hypothesis II is concerned with the answer to the question of what extent the mode of deliberating of a development group affects the criterion function of the explicit beliefs.
The investigation into the manner of deliberating remained limited to the aspect of rationality. (It is intended that subsequent studies will also involve other aspects). The examined hypothesis may therefore be worded as follows:
The more rationally a development group conducts its deliberations, the better the explicit beliefs will operate as criteria.
Below, we shall in turn describe how the concept "type of deliberation" has been defined and operationalized (2.3.1.); how the material for analysis is selected (2.3.2.); and finally how we expect to answer hypothesis II (2.3.3.). In 3.2. the results and a few provisional conclusions will be given.

2.3.1. Operationalizing the Concept Rationality of Deliberation

As was mentioned before, in the first instance we confined ourselves to the aspect of "rationality of deliberation". A normative model of rationality has in fact often been constructed for the manner of reasoning, but there are hardly any models for deliberation situations with more ($n > 2$) members. Literature presenting what might be called rational deliberation situations can be found, but the elaboration of the concept remains at a level where empirical research has little to go upon (Grice, 1975; Putnam, 1975).
It may be held an additional restriction that the time available for the development of an instrument was brief indeed: for the development of a solid instrument one ought to reckon in years, rather than, as in our case, in months. The operationalization such as it has been done must therefore mainly be seen as an attempt to develop in the short run an instrument that might reflect the concept rationality of deliberation with as much intersubjectivity as could be attained.

By "deliberation" is understood:
A situation where several people, by means of advancing arguments, try to arrive at a decision concerning a specific subject.
Literature and common sense provided seven rational elements of deliberation

situations which might be defined as requirements of rationality and would seem to be quantifiable by an observer (see a.o. Bormann, 1969; Heller, 1971).

1. *Intersubjective clarity*: everybody understands the other's meaning.
2. *Relevance of statements*: the statements made by members are relevant and seen as such by the members.
3. *Quantity of argumentation*: in respect of the decision sufficient argumentation has been given.
4. *Quantity of decision-making*: in proportion to the arguments adduced, the decision has been sufficiently worked out.
5. *Support of decision*: the decision is sufficiently supported by the group members.
6. *Quantity of benefits and drawbacks*: sufficient aspects of the subject have been considered.
7. *Quantity of verification*: after the decision has been achieved, it has been sufficiently verified whether it is in accordance with the object of the deliberations.

Out of these seven elements, seven statements have been formulated which may of may not apply to a deliberation situation, like this from the sixth element of rationality: "Sufficient benefits and drawbacks have been discussed".

For the aspect of rationality to be defined as objectively as possible, given the practical research facilities, a procedure has been sought where most weight is attached to the intersubjectivity of the element of rationality in deliberating. For that purpose, we considered it necessary first to have a validating investigation for the determination of the respective weight of the elements.

In practice, this amounted to presenting the statements (each written on a separate card) to a number of experts (n = 5). They were asked to place the cards, that is, the statements in consecutive order from "most important" to "least important" according to their own judgement. In this way, an intersubjectively reliable impression was gained of which elements were considered important and which relatively unimportant. To the element which was reported to be most important weight 7 was assigned, to the reportedly least important element weight 1. By adding up the weights given to an element by each validator we obtained its validation weight. Thus the elements were sorted out by the characteristic of "most important element". The construction of the instrument that claims to measure rationality of deliberation was completed with this.

During the next stage critics were approached for their comments upon actual deliberation situations derived from the protocols of meetings, judged by the seven elements. This was accomplished by their indicating to what extent they agreed with the seven statements in respect of individual deliberation situations.

Each deliberation situation was rated separately on each statement, so that any effects of ranking did not apply to the deliberation situation under review; the least result would be that the situations could be arranged in order of rationality. In the eventual assessment, unanimity of critics was included by regarding this as an additional weight.

By unanimity was understood:

1 less the quotient of the variance found divided by the maximum variance (given the mean result); in symbols:

$$U = \left(1 - \frac{V}{V_{max}}\right) \qquad (1)$$

U = unanimity
V = variance found
V_{max} = maximum variance given mean M on a k-point scale;
$V_{max} = (M-1)(k-M)$

In this way, ideosyncracies of individual critics were unlikely to affect the overall assessment.

Each fragment, having been rated, had got seven scores (from the seven elements). Before these scores were cast up, they were weighted with the help of the validation weight and the unanimity weight. The result is a total score per deliberation fragment which is represented as follows:

$$R = \frac{\sum_{i=1}^{7} b_i U_i M_i}{7} \qquad (2)$$

R = rationality score
b_i = validation weight of element i
U_i = unanimity weight of element i
M_i = mean score of element i

2.3.2. Establishing the Influence

It has been assumed that explicit beliefs can be arranged in order of relative influence on the development process (2.2.2.1.). Thus explicit beliefs of high influence and such of low influence were available. The beliefs had been discussed in meetings of the development team or in deliberation situations. It was practically unfeasible to have all deliberation situations containing such explicit beliefs criticised. We therefore decided to obtain a sample from the deliberation situations. This sample was selected randomly from the population of deliberation situations containing explicit beliefs.

The population was made up as follows. Out of all the meetings held in the course of the development process, we first confined ourselves to such meetings as had resulted in the written sources: "framework", "record of beliefs" and "curriculum". In the worked-out protocols of the meetings the explicit beliefs were underlined; then parts of a meeting containing explicit beliefs were arranged in self-contained fragments in which a particular topic was discussed. From these fragments of deliberation the sample was drawn.

Each fragment was rated on the seven elements by the critics. The sum of the means of the elements provided the score for each deliberation situation. As a result it was possible to rank the deliberation situations. The relationship between the ranking in order of rationality of the deliberation situations on the one hand, and the ranking in order to influence exerted on the choosing and decision process by the explicit beliefs on the other hand provides the answer to the question arising out of the hypothesis.

2.3.3. Testing the Hypothesis

The more rational the deliberation, the higher the influence exerted on the development process by beliefs occurring in that deliberation.

According to the arrangement of the explicit beliefs (Be), each explicit belief has a number. In the deliberation situations examined, various explicit beliefs occur. Apart from their rank in order of influence on the development process, these explicit beliefs are given a number in order of rationality of the deliberation situation in which they occur. In this way, "ties" occur. For the hypothesis to be answered, Spearman rank-order coefficient of correlation, r_s, corrected for ties, will be calculated. We deem hypothesis II rejected if $r_s = 0$ ($\alpha = .05$, one-tailed).

3. Results

This paragraph will present the investigation results from each hypothesis and a number of tentative conclusions from the study will be drawn. As mentioned in 2.1.2. the results involve data obtained from one development project. Therefore, the conclusions at this stage are of a preliminary nature. For an account of the design of the study and the mode of procedure we refer to paragraph 2.

3.1. Hypothesis I: The Influence of Be and Bi

The research data were obtained from a development project for the development of a science curriculum at nursery school level. In conformity with the criteria as started in 2.2.1.1., at three points during the process a list of explicit beliefs was made up. In Table 1, the number of explicit beliefs is presented for each of these moments.

Table 1: *Number of Be at three moments of the process (Curtel project)*

Moment	Number of explicit beliefs
Framework	21
Evaluation plan	23
Curriculum	23

The results concerning the relative influence of Be and of Bi on the choosing and decision-making process are dealt with in two separate paragraphs.

3.1.1. The Influence of Explicit Beliefs

In order to establish the influence of explicit beliefs, lists of components of the framework, the evaluation plan, and the curriculum were made up. The components were also classified in categories.
They were then examined to see to what degree reasons given by the development group for the choice of or for the decision to include these components in the framework, the evaluation plan and the curriculum respectively were attributed to the explicit beliefs.

The following table presents the influence of the Be on the framework, the evaluation plan and the curriculum respectively.

Table 2: *The influence of Be on the framework, the evaluation plan, and the curriculum (Curtel project)*

Category	Framework					Evaluation Plan					Curriculum				
	A	B		C		A	B		C		A	B		C	
		n	%	n	%		n	%	n	%		n	%	n	%
-	34	13	24.1	7	13.0	27	5	18.5	-	-	57	13	22.8	8	14.0
	66	9	13.6	3	4.5	22	2	9.1	-	-	68	9	13.2	5	7.4
M	71	2	2.8	-	-	6	-	-	-	-	99	2	2.0	-	-
E	-	-	-	-	-	1	-	-	-	-	2	1	50.0	1	50.0
G	26	-	-	-	-	2	-	-	-	-	27	-	-	-	-
O	24	-	-	-	-	3	1	33.3	-	-	24	-	-	-	-
Total	241	24	10.0	10	4.1	61	8	13.1	-	-	277	25	9.0	14	5.1

A = number of components
B = number and percentage of components with reason stated
C = number and percentage of components with reason attributed to Be

From the table, the following conclusions may be derived:

a. Approximately 10% of all components of the framework, the evaluation plan and the curriculum have been discussed by the development group, in the sense that the group has indicated its grounds for including them.
b. Only for 4 to 5% of components included the reasons given by the group were prompted by explicit beliefs.
c. The influence of Be on framework and curriculum is markedly higher than its influence on the evaluation plan.
d. If this influence is split up, the influence on the categories S and A is markedly higher than that on other categories.

Out of the 21, 23 23 explicit beliefs 4, 0 and, 5 have been used in effect (19.0%, 0%, and 21.5% respectively), which leads us to conclude that:

- the great majority of the explicit beliefs was not used as a criterion for components to be included in either framework or evaluation plan or curriculum;
- the reasons given for only a very low percentage of decisions were attributed to the explicit beliefs.

The data which have become known from a different development project suggest the same tendencies.

3.1.2. The Influence of Implicit Beliefs

The analytical method for the inventorization of implicit beliefs as described earlier produced seven implicit beliefs. With the help of the list of components which had been developed, the influence was established according to the procedure outlined in 2.2.2.2.

The table below shows the influence exerted by implicit beliefs on framework, evaluation plan and curriculum respectively.

Table 3: *The influence of Bi on framework, evaluation plan and curriculum (Curtel project)*

Category	Framework			Evaluation Plan			Curriculum		
	A	B		A	B		A	B	
		n	%		n	%		n	%
S	54	18	33.3	27	3	11.1	57	18	31.6
A	66	62	94.0	22	4	18.2	68	64	94.1
M	71	1	1.4	6	1	16.7	99	1	1.0
E	-	-	-	1	-	-	2	2	100.0
G	26	10	38.5	2	-	-	27	10	37.0
O	24	-	-	3	-	-	24	-	-
Total	241	91	37.8	61	8	13.1	277	95	34.3

A = number of components
B = number and percentage of components with reasons attributed to Bi

From this table the following conclusions may be derived:

a. Nearly one third of all the components of the framework, the evaluation plan and the curriculum can be traced to implicit beliefs.
b. Implicit beliefs exert considerably more influence on the framework and curriculum than on the evaluation plan.
c. The influence is perceived in all categories except M and O.

3.1.3. Provisional Conclusions

To test hypothesis II we used the data from 3.1.1. and 3.1.2.. Table 4 shows the influence of Be and Bi on the three products: the framework, the evaluation plan and the curriculum.

Table 4: *The influence of Be and Bi on the framework, the evaluation plan and the curriculum*

	A	B	p_e	C	p_i
framework	241	10	.041	91	.378
evaluation plan	61	-	-	8	.131
curriculum	277	14	.051	95	.343

A = number of total components
B = number of components with reasons attributed to Be
C = number of components with reasons attributed to Bi

Table 4 shows a greater influence of Bi than of Be. For testing H_o we assumed p_e and p_i to be equal (2.2.3.), in other words: given p_e, what is the probability of p_i occurring. The respective z-values for framework, evaluation plan and curriculum were 26.350, -3.032, and 22.087. It should be obvious that the associated p-values are negligible: all p-values are $< .05$.

For the time being, therefore, the conclusion must be that the influence of Be does not exceed the influence of Bi. As clearly appears from table 4, the opposite is true. Even if category A is omitted (see tables 2 and 3), equality of influence must be denied.

3.2. Hypothesis II

3.2.1. Influence of Rational Deliberation

First the measuring of rationality will be described, then we shall proceed to test hypothesis II.

With regard to making the concept "rationality of deliberation" operational (2.3.1.), we described (1) a validation of the elements of

rationality and (2) the intersubjective establishment of the concept "rationality of deliberation" using the deliberation fragments.

sub (1) Five experts were presented with the seven cards describing the elements. This resulted in the validation weights (b) shown in Table 5.

Table 5: *Validation weights of the elements*

element	mean position	validation weight
1	3.6	0.129
2	4	0.143
3	3.4	0.121
4	4.4	0.157
5	5	0.179
6	3	0.107
7	4.6	0.164
totaal:	28	1.000

sub (2) Five other experts were given seven fragments taken from the deliberations. The fragments were self-contained pieces of worked-out protocols of meetings.
They contained thirteen out of the total amount of twenty-three explicit beliefs. For each element the critics were asked to rate the fragments, so that every critic had to do 49 ratings. The rating given each fragment per element was indicated on a 7-point scale. Table 6 shows the ratings found. (These were calculated using formula (2), after the unanimity weights (U) per element had been established for each fragment according to formula (1); for each fragment the element scores were totalized. The total score (ΣR) for each fragment is shown in Table 6.)

Table 6: *Total Scores for fragments A - G*

	A	B	C	D	F	G
ΣR	59.6	93.8	92.8	135.4	41.3	89.8

All deliberation fragments included at least one Be. The ranking of a Be depends on the fragment in which it is contained. In Table 7 the explicit beliefs are shown followed by two numbers: (1) in order of the fragment in which they were contained and
(2) in order of the number of components for which they functioned as a criterion.

Table 7: *Ranking of explicit beliefs in order of (1) fragment of deliberation and (2) in order of criterion function*

Be	(1)	(2)
8	11.5	8
9	11.5	8
10	2.5	8
11	2.5	1
12	2.5	8
13	2.5	8
14	8	8
15	8	2
16	8	8
17	5.5	8
18	5.5	8
19	13	8
20	10	8

The Spearman rank-order coefficient of correlation (corrected for ties) was .228. A low correlation. Especially the ranking in order of criterion function was problematic as in fact only two of the explicit beliefs (11 and 15) which appeared in the fragments had been of any importance; the remaining eleven were not used as grounds for the inclusion of curriculum components.

3.2.2. Provisional Conclusions

It has not been quite possible to calculate the relationship between the two rankings of explicit beliefs. The investigated project had made too scarce effective use of the explicit beliefs in assigning reasons to curriculum components to permit this. It would seem likely, however, from the project which are to be analyzed as yet, that this defect is not due to the design of the study but to the project which has been analyzed (see also the provisional conclusions in 3.1.3.).

For the time being, then, the conclusion is that a positive influence of rationality of deliberation on the development process must be seen as a hypothesis which can at least be retained, even if in fact empirical corroboration is still lacking. However, we believe we possess an instrument which must be deemed capable of providing sufficient data to permit us to test the hypothesis.

4. Discussion

The conclusions such as they have been given in the preceding paragraph are of a tentative nature. As was mentioned earlier, the Curvo project has joined in four curriculum development processes, all of which have adopted the Curvo strategy for the development of curriculum materials. For the use of this study data had become available from only one of the projects. The remaining data are at present being analyzed.

Another restriction which leads us to be cautious in drawing conclusions at this moment is due to the analytical method employed in finding out what implicit beliefs existed and what influence they exerted on the choosing and decision process.

The method of 'progressive focusing' developed by us is likely to have been applied in this study for the first time and requires thorough training. It may probably be assumed that as a consequence not all implicit beliefs which were present could be ascertained. A more refined method which must as yet be developed will have the effect that even more influence of implicit beliefs can be established than we could do now.

A final restriction is associated with the sample of deliberation fragments which was drawn from the deliberation situations. As it turned out, only two explicit beliefs were represented which functioned as criteria and as a result the outcome of hypothesis II lost much of its significance. In the rest of the investigation we shall have a randomized sample of ≥ 7.

Particularly the provisional conclusions which could be drawn from hypothesis I would seem to be of great interest to curriculum development processes. The analysis suggests that implicit beliefs influence the choosing and decision process to a greater extent than explicit beliefs. This observation is important because it implies that a considerable part of the choosing and decision process escapes being perceived by the group. It is thought that this entails that irrational decision-making will prevail over rational decision-making. Decisions will more often be founded on the exercise of power, predominance or vagueness. It may be expected that as a consequence development processes:

- are conducted less efficiently and
- there will be less consensus on the end product (the curriculum).

Both are factors which will adversely affect the quality of the curriculum

achieved. This complex set of problems will be studied extensively in further investigation.

If the above plausible assumptions should be correct, some consequences will ensue for the present Curvo strategy. For if implicit beliefs have more influence than the explicit beliefs required by the Curvo strategy, the question presents itself how implicit beliefs must be made explicit by the group. It is our impression that the Curvo strategy does not take sufficient account of the trouble it costs a group to clarify their implicit beliefs and make them explicit. More attention will have to be paid to this.

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